ARITHMETIC

DRAWER 4 EDUCATION

Abraham Lincoln and Education

Arithmetic

Excerpts from newspapers and other sources

From the files of the

Lincoln Financial Foundation Collection

LINCOLN LORE

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LINCOLN LORE

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Dr. Louis A. Warren - - - - Editor

PIKE'S ARITHMETIC

We are including Pike's arithmetic in the list of school books Lincoln used, solely on the statement of William Herndon. What his authority was for placing this text in his list of Lincoln's school books he does not state.

After making a comparative study of the text of Pike's arithmetic and the copy book Lincoln made we have been unable to find but one point of direct contact.

Facsimiles of several pages of this interesting hand made book of sums are before us. As in most cases where such books were prepared they were copied either directly from an arithmetic or used in the class room to copy problems presented by the teacher. The last method amounted to the same as the first as the teacher undoubtedly used the same text as a source book.

The question in point is: What was the original text used by either Lincoln or his school teacher which served as a source for the data in the copy book?

It has been suggested by some Lincoln authorities that Pike's arithmetic is the only one mentioned as having been used by the president in his primary education.

Buried in the great mass of eulogies prepared at the time of Lincoln's assassination is one delivered before the New England History-Geneological Society at Boston on May 3, 1865, by Elias Mason. In his very interesting and reliable biographical sketch of the martyred president, he states that:

"It is true that young Lincoln in his buckskin clothes and racoon-skin cap did pick up a little of 'Dobell's arithmetic'."

A typographical error has evidently been made here in the spelling of the name of the compiler of the arithmetic as the author of the first American textbook on arithemetic was named Nathan Daboll. For many years in the latter part of the eighteenth century this was the only text book on mathematics in America.

Whether or not the problems which Lincoln copied in his sum book are in agreement with those in Daboll's arithmetic we are not informed but they do not appear to be copied from Pike's. But one apparent agreement has been discovered which seems to suggest a common origin of form used, "I demand, etc."

In Lincoln's copy book this writing appears:

"An army of a 10000 men having plundered a city took so much money that when it was shared among them each man had £27. I demand how much was taken in all."

Pike's arithmetic puts a problem in this way:

"A shopkeeper sold 13 yards of cloth, on the following terms: viz. 2d. for the first yard, 4d for the second, 8d for the third, &c; I demand the price of the cloth."

Isaac N. Arnold, one of the early biographers of Lincoln, makes this statement in a foot note:

"I have in my possession, a few pages from his manuscript 'Book of Examples in Arithmetic.' One of these is dated March 1, 1826, and headed 'Discount', and then follows in his careful handwriting, first: 'A definition of Discount,' second: 'Rules for its compution,' third: 'Proof and various Examples,' worked out in figures etc.; then 'Interest on money' as treated in the same way, in all his own handwriting. I doubt whether it would be easy to find among scholars of our common or high schools, or any school of boys of the age of seventeen, a better written specimen of this sort of work, or a better knowledge of figures than is indicated by this book of Lincoln's, written at the age of seventeen."

It is not the purpose of this broadside, however, to discuss Lincoln's copy book, except as we might hope to find some evidence that Pike's arithmetic was the original source. In this effort we seem to have found little evidence to support its supposition.

Lincoln's last school teacher Azel W. Dorsey is said to have described his illustrious student as coming to the log cabin school house, "provided with an old arithmetic which had somewhere been found for him to begin his investigations into the 'higher branches'." This reminiscence does not state the name of the arithmetic Lincoln brought to school.

The
New Complete System
of
ARITHMETIC
composed for
The Use of the Citizens of the United States

By NICHOLAS PIKE, A.M.
Member of the American Academy of Arts and Sciences

Abridged for the Use of Schools

Fifth Edition

BOSTON
Printed by J. T. Buckingham
For Thomas & Andrews
Sold at their Book Store, No. 45 Newbury Street, and by the book sellers throughout the United States

October, 1804

Pike's arithmetic was first issued in 1788 by Nicholas Pike, A.M., A.A.S. The book went into several editions. The copy before us was published in 1804 and is the fifth edition of the text. It was twenty years later than this, that Lincoln studied arithmetic and if he used the work of Pike the book may have been a revised later edition.

On page 34 appears that familiar old chant of the seasons:

"Thirty days hath September, April, June, and November,

February 28 alone, and all the rest have 31."

Followed by the notation:

"When you can divide the year of our Lord by four, without any remainder, it is then Bissextile, or Leap Year, in which February has 29 days."

The book contains in addition to the customary measures, and tables of weights, an ale or beer measure and a wine measure,—as well as a cloth measure in which "four nails make one quarter yard."

Dry measure according to a note is applied to all "dry goods, as corn, seed, fruits, roots, salt, sand, oysters, and coals."

Other interesting sections are those on single and double fellowship, dealing with problems of men who "share the same grazing pasture, and barn."

The book contains several queerly worded problems and many "catch" propositions also find their way into the quaint volume. For instance:

"Nine gentlemen met at an inn, and were so pleased with their host and with each other, that in a frolick they agreed to tarry so long as they, together with their host, could sit every day in a different position at dinner; pray how long, had they kept their agreement, would their frolick have lasted?"

Again: "Suppose a number of stones were laid a yard distant from each other for the space of a mile, and the first, a yard from a basket; what length of ground will that man travel over, who gathers them up singly, returning with them one by one to the basket?"

Could our popular present-day Potato race have been derived from this old problem?

The Rule of Three

The calculus of proven mathematics was the "Rule of Three." To this Abraham Lincoln aspired. The Rule of Three was the method of finding a fourth term of a proportion when three are given. The numbers being so arranged that the first is to the second as the third is to the fourth, which test is that term required to be found. Abraham proceeded by multiplying the second and third terms together and dividing the product by the first. This seems to have been the climax of Lincoln's primary education.

EXTRA BINDERY RESTORES A RARE PIECE OF

Lincolniana

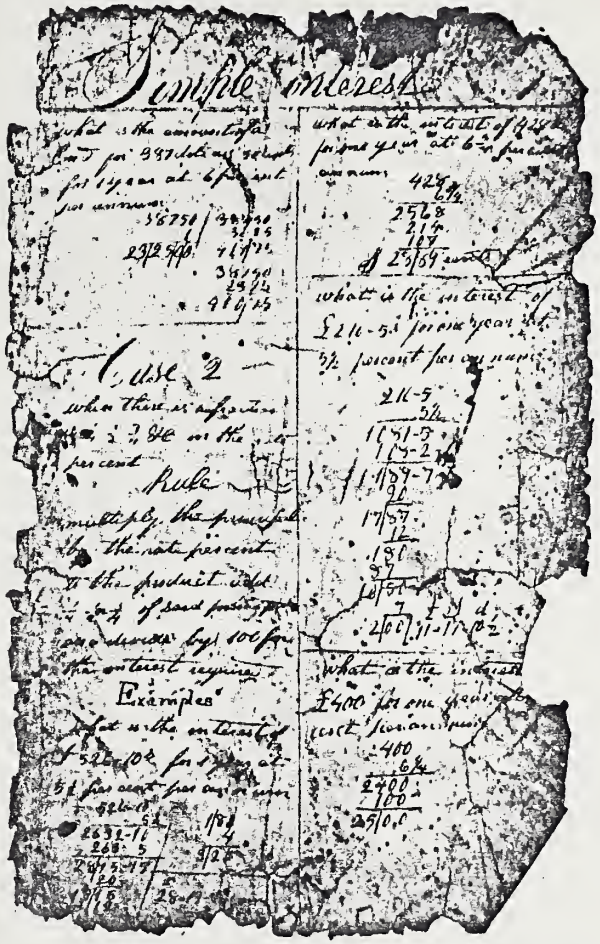
FREQUENTLY COLLECTORS bring to us books and papers which have suffered damage through age. To preserve them and to put them in a useful condition, they need repair and restoration. We take a great pride in doing this work. It is one of the normal functions of our Extra Bindery.

One of the latest pieces to come in for this type of work is a rare and interesting leaf from an Abraham Lincoln boyhood copybook—one on which Lincoln put down his arithmetical sums worked out. It is currently the property of the Abraham Lincoln Book Shop in this city.

Evidences of his early schooling have long been treasured items sought after by historians and collectors. Although Lincoln had an innate hunger for learning, he actually had very little elementary schooling. None of it went beyond "readin', writin', and cipherin' ". He went to school scarcely twelve months over a period of ten years but taught himself by studying and reading in his spare time.

From a letter written in 1881 by William H. Herndon, Lincoln's law partner, and furnished to us by Mr. Newman of the Abraham Lincoln Book Shop, we have been able to gather the interesting background of this copy leaf.

"I was collecting the facts of Mr. Lincoln's life in 1865–6 and went into Coles County, Illinois, to see his step-mother; found the motherly, good old lady, and took down her testimony, etc., as material of his life, etc., During her examination she let drop, in her conversation, the fact that Mr. Lincoln when a boy had two copybooks, in which he wrote down his sums worked out, and wrote in his literary one what seemed strong, beautiful or good. We, the Lincoln family and myself, commenced the search and found the arithmetical book, but not the other: gone, and gone forever . . .



"To keep the leaf, get two glasses, say 10"x12"—clean and clear glass like perfect window glass—put the leaf between the two glasses, hang up in the hall, and it will last for ages, keep a watch-out that too much light does not exhaust the ink: dry it out or up, etc."

Actually Mr. Herndon's prophecy that the leaf would last for ages was only partially true. It had deteriorated and needed repairing. To accomplish this, the fragments were taken from the glass and mounted between two layers of very thin silk chiffon. The edges were left irregular, as shown in the illustration, although actually our skilled staff could have restored the leaf to its original form.

The Extra Bindery has in the past repaired and restored many historical papers. The most notable of these is the work performed on one of the authentic hand written copies of the Gettysburg address. This is the one purchased in 1944 with $60,000 raised by the school children of Illinois and presented to the Illinois State Historical Society. Another was the restoration of the famous Lincoln-Hooker letter, written during the Civil War.

This work is only one of the functions of the Extra Bindery. The term "extra binding" means extra workmanship with extra quality of materials. It has since earliest times been of the most important of hand crafts. To preserve and to encourage it, The Lakeside Press in 1921, established an Extra Bindery. Today it serves individuals, collectors, libraries and bookdealers from coast to coast in creating fine bindings for rare books, valuable papers, institutional books and presentation volumes. In days gone by, much of this work was performed by foreign firms, notably English firms. Today it is performed at The Lakeside Press with equal skill.

Exercise Multiplication

There were 10 men concerned in paying a sum of money and each man paid 1271£ how much was paid in all ——

1271
10
12710£
1271

If 1 foot contain 12 inches I demand how many inches are in 126 feet ——

126
12
252
126
1512

Compound Division

Q What is compound Division

When several numbers of Divers Denomination are given to be divided by 1 common divisor this called

Compound Division —

To Exercise Multiplication

There were 40 men concerned in payment a sum of money and each man paid 1271£ how much was paid in all ——

1271
40
40 50840
1271

If 1 rod contain 12 inches & demand how many inches are in 126 feet —

126
12
252
126
1512
126

# of Compound Division

Q What is compound Division

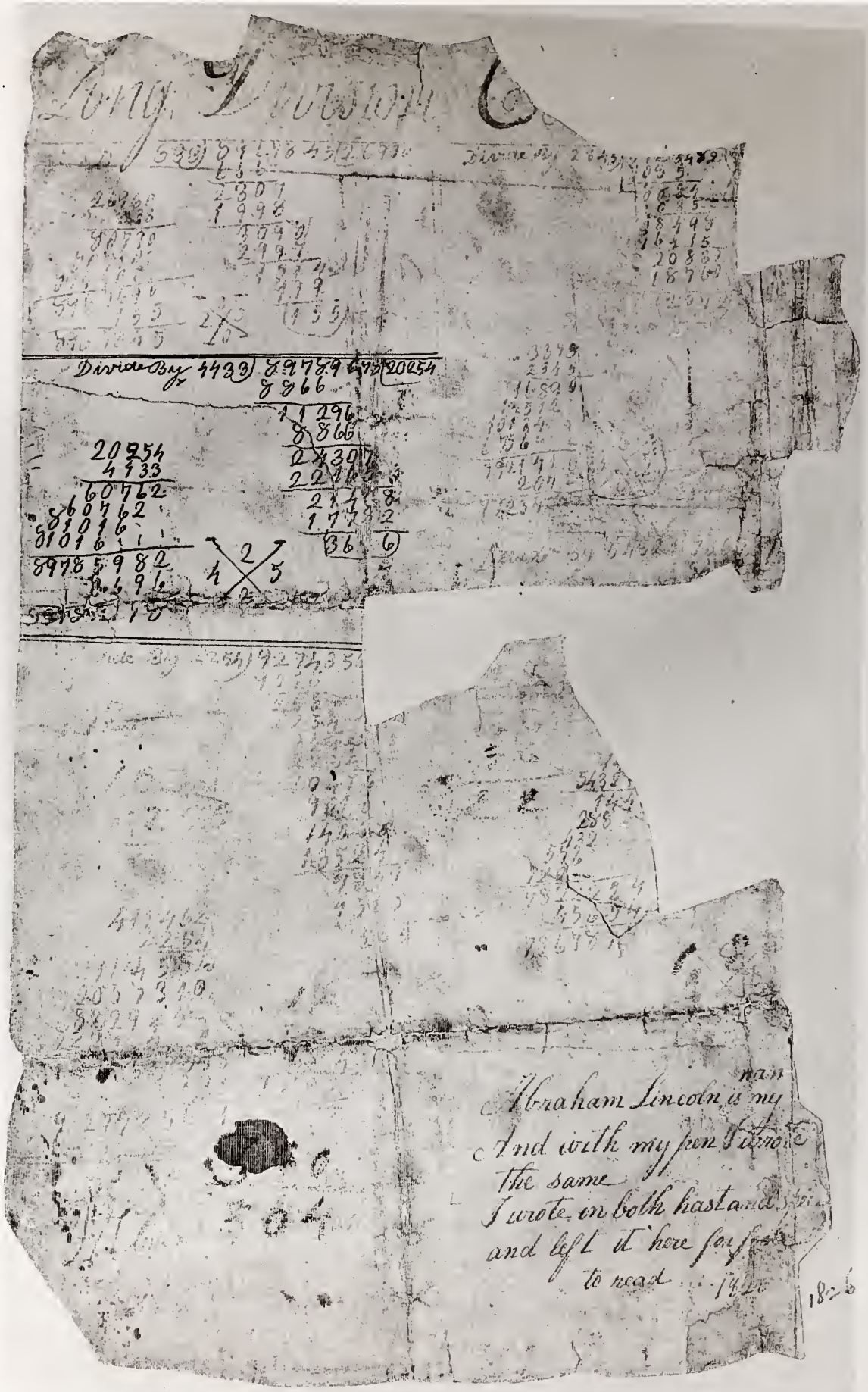
A When several numbers of divers Denomination are given to be divided by 1 common divisor this called Compound Division

4)9 - 12 - 6½
2 - 1 - 3¼
2
18 - 12 - 6½

7)16 - 12 - 10
9 - 5 - 4½
1 - 10

In possession of Oliver R Barrett.

Herndon-Weik Collection, Library of Congress


Divide By 4433
20254
Divide By
man
Abraham Lincoln is my
and with my pen I wrote
the same
I wrote in both hast and
and left it here for
to read
1826

TAYLOR UNIVERSITY

February 4, 1991

Ruth E. Cook
The Lincoln Museum
1300 South Clinton Street
P.O. Box 1110
Fort Wayne, IN 46801

Dear Ms. Cook:

Thank you for the calendar. I will be happy to explain what "cipher to the rule of 3" means. It means solving a specific equation of the form

$$\frac{a}{b} = \frac{c}{x}$$

where a, b, and c are given numbers. For example, if a = 3, b = 6, and c = 5, the equation would be

$$\frac{3}{6} = \frac{5}{x}$$

and the solution would be

$$x = \frac{5 \cdot 6}{3} = 10.$$ i.e. $x = \frac{5 \cdot 6}{3} = \frac{30}{3} = 10$

It was probably called ciphering to the rule of 3 because the first three numbers of a proportion were given and the student needed to find the fourth number. If this explanation is not clear, please let me know and I will try again.

What I have described was called the single rule of three. It is described on pages 74 and 75 in The Teachers Assistant or A System of Practical Arithmetic by Stephen Pike, Philadelphia, 1821. The double rule of three is described on pages 82 and 83 of the same book. I believe that Lincoln used this textbook in some edition. I have a copy of this book and am enclosing photocopies of two pages.

Sincerely,

David L. Neuhouser

David L. Neuhouser
Professor of Mathematics

Answered 2/21/91 RC

Upland, Indiana 46989
317-998-2751

RULE.

Write down, for the third term, that number which is of the same name or kind with the answer.

Consider, from the nature of the question, whether the answer should be greater or less than this third term. If it is to be *greater*, set the greater of the two remaining numbers on the left hand, for the second term, and the other for the first; but if *less*, set the less of those two numbers for the second, and the other for the first.

When the question is thus stated, if the first and second terms be not of the same denomination, reduce one or both of them till they are; and if the third term consist of several denominations, reduce it to its lowest denomination; then,

Multiply the second and third terms together, and divide the product by the first term: the quotient will be the answer.

Note.—The product of the second and third terms is of the same denomination as the third term; and the learner may be reminded, that the quotient and remainder are of the same denomination as the number divided.

See examples 14, 15 and 16, under rule 1, and 7, 8, under rule 3, Compound Division.

The rule which is given above, as it renders the distinctions of *direct* and *inverse* proportion unnecessary, and has several other advantages, is preferable to the one which was formerly used; and it is likely to be generally adopted: but, for the convenience of those teachers who have not yet determined to employ it, the last mentioned rule is subjoined.

RULE FOR STATING.

Set that term of the supposition which is of the same name or kind with the term of demand, in the first place; set the other term of supposition in the second place, and the term of demand in the third place.

When the question is thus stated, consider whether the proportion is direct or inverse.

The proportion is direct, when the third term is greater than the first, and the nature of the question requires that the fourth term, or answer, should be greater than the second; or when the third term is less than the first, and it is required that the fourth term be less than the second.

The proportion is inverse, when the third term is greater than the first, and the fourth is to be less than the second; or when the third term is less than the first, and the fourth is to be greater than the second.

RULE FOR DIRECT PROPORTION

If the first and third terms be not of the same denomination, reduce both to the lowest in either; and if the second term consist of several denominations,

PROOF.

Invert the question, making the answer the third term, as in the following wrought examples.

EXAMPLES.

1. If 2 yards of muslin cost 4 shillings, what will 6 yards cost?

yds.	*yds.*	*s.*		*yds.*	*yds.*	*s.*
2	: 6	: :		6	: 2	: : 12
	4					2
	2)24				6)24	
Ans.	12 *s.*			Proof	4 *s.*	

---

reduce it to its lowest denomination; then, multiply the second and third terms together, and divide the product by the first term; the quotient will be the fourth term, or answer, in the same denomination as the second, or that to which the second was reduced.

EXAMPLE.

If 2 yards of muslin cost 4 shillings, what will 6 yards cost?

yds.		*s.*		*yds.*
2	:	4	: :	6
				1
		2)24		
		12 Answer.		

RULE FOR INVERSE PROPORTION.

Multiply the first and second terms together, and divide the product by the third; the quotient will be the answer in the same denomination as the second or that to which the second was reduced.

EXAMPLE.

If 4 men can build a wall in 4 days, how many men can do it in 8 days?

men.		*days.*		*days.*
4	:	4	: :	8
		4		
		8)16		
		2 Answer.		

place, and consider each pair of similar terms and this third one, as the terms of a stating in Simple Proportion, and set them severally, in the first and second places, agreeably to the directions under that rule.

When the question is thus stated, reduce the similar terms to like denominations, and then multiply all the terms in the second and third places together, and divide the product by the product of those in the first place: the quotient will be the answer, or term sought.

The above rule is prefered for reasons similar to those which have been given for adopting the new rule for Simple Proportion: the one formerly used is, however, subjoined.

RULE FOR STATING.

Set the two terms of supposition which are of the same name or kind as those of the demand, one under the other, in the first place; that of the same kind as the answer in the second, and those of the demand in the third, with the two correspondent terms of the supposition and demand opposite to each other, and of the same denomination.

When a question is stated, consider the two upper terms with the middle one, as a stating in the Single Rule of Three, and also the two under terms, with the middle one, as a stating in the same rule; if, in both instances, the proportion be direct, the question is in direct proportion; but if in either of them the proportion be inverse, the question is in inverse proportion.

RULE FOR DIRECT PROPORTION.

Multiply the two terms in the third place together, and multiply the product by the middle term; divide the last product by the product of the terms in the first place, and the quotient will be the answer, in the same denomination as the middle term.

EXAMPLE.

If 6 men in 8 days eat 10 lb. of bread, how much will 12 men eat in 24 days? Ans. 60.

6 men } 10 lb. { 12 men
8 days } { 24 days

48
24
288
10

48)2880(60 lb.
288

Contracted.

6 } 10 { 12 2
8 { 24 3

6
10

60 lb.

PROOF.

By two statings in the Single Rule of Three.

Note.—If either of the two first terms, or both, will divide, or can be divided by any of the three last, or if any other number will divide one of the first and one of the last, without a remainder, the operation may be contracted by using their quotients in their stead.

EXAMPLES.

1. If 6 men in 8 days eat 10 lb. of bread, how much will 12 men eat in 24 days? Ans. 60.

men 6 : 12 }
days 8 : 24 } :: 10 lb.

288
10

48)2880(60 Ans.
288

0

Contracted.

6 : 12 2 }
8 : 24 3 } :: 10 lb

6
10

60 Ans.

2. If 3 men in 4 days eat 5 lb. of bread, how much will suffice 6 men for 12 days? Ans. 30 lb.

3. Suppose 4 men in 12 days mow 48 acres, how many acres can 8 men mow in 16 days? Ans. 128 A.

RULE FOR INVERSE PROPORTION.

Transpose the inverse extremes; that is, set that which is in the first place under the third; and that which is in the third place under the first; then work as in Direct Proportion.

EXAMPLE.

If 7 men reap 84 acres of wheat in 12 days, how many men can reap 100 acres in 5 days? Ans. 20

84 A }
12 D. } 7 m. {
5 }

420

100 direct
5 inverse
12

1200
7

420)8400(20
840

0

Contracted.

)84 }
12 } 7 m. {
5 }
7 }

100(20 Ans.
5
12